

ACTION: Docket Submittal for  
Docket No. NHTSA-2005-22223--19

TO: DOT Docket Management

FROM:   
Christopher M. Calamita  
Attorney-Advisor

Please submit the following document, "Comments from Regulatory Analysis Review Group to the Proposed Light Truck Average Fuel Economy Standards for Model Years 1983-1985" to Docket No. NHTSA-2005-22223.

This submission provides the complete comments from the Regulatory Analysis Review Group (RARG) regarding NHTSA's December 7, 1979 proposal of light truck standards for model years 1983-85, which is referenced in the notice of proposed rulemaking regarding the light truck CAFE standards for model years 2008-2011. In its comments, the RARG suggested a CAFE structure in which NHTSA would set "fuel economy targets for different categories of trucks, and [use] a pre-determined fleet mix for each manufacturer to turn these targets into a composite standard."

The RARG was established by President Carter to review rulemaking proposals classified as significant under Executive Order 12044. It was chaired by the Council of Economic Advisors (CEA) and was composed of representatives of the Office of Management and Budget and the economic and regulatory agencies.

FE-78-01-NO1-175

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EXECUTIVE OFFICE OF THE PRESIDENT  
COUNCIL ON WAGE AND PRICE STABILITY  
WINDER BUILDING, 600 - 17TH STREET, NW.  
WASHINGTON, D.C. 20506

March 31, 1980

ORIGINAL

NHTSA-05-22223-19

Honorable Joan Claybrook  
Administrator  
National Highway Traffic Safety  
Administration  
Washington, D.C. 20590

Dear Ms. Claybrook:

In my letter to you of February 25, 1980, I identified the concerns on which the Regulatory Analysis Review Group (RARG) was focusing in its review of the National Highway Traffic Safety Administration's proposed Light Truck Fuel Economy Standards for Model Years 1983-85. The RARG now has completed that review, and the outcome is the enclosed report which I request be placed in the public record for this proceeding.

Sincerely,

*R. Robert Russell*  
R. Robert Russell  
Director

cc: Members of Regulatory Analysis Review Group

Docket Section  
National Highway Traffic Safety  
Administration  
Docket No. FE78-01; Notice 1  
Room 5108  
400 Seventh Street, S.W.  
Washington, DC 20590

National Highway Traffic Safety Administration's  
Proposed Light Truck Average Fuel Economy  
Standards for Model Years 1983-1985

Report of the  
Regulatory Analysis Review Group  
Council on Wage and Price Stability  
March 31, 1980

## Introduction

On December 31, 1979, the National Highway Traffic Safety Administration (NHTSA) proposed average fuel economy standards for light trucks manufactured in model years 1982-85. <sup>1/</sup> Title V of the Motor Vehicle Information and Cost Savings Act requires that NHTSA set such standards at the "maximum feasible average fuel economy level." NHTSA proposed specific standards for the 1982 model year and ranges of possible standards for 1983-85. The proposed 1982 standards are not intended to require significant changes in manufacturers' plans. The comment period for the 1982 standards closed on January 31, 1980, and NHTSA intends to issue them in final form in March 1980.

The Regulatory Analysis Review Group (RARG) is reviewing the 1983-85 standards for several reasons. First, NHTSA has encouraged a constructive discussion of the rulemaking both by proposing a range of standards and by identifying and soliciting comment on many of the issues discussed in this report. Second, truck fuel efficiency standards may involve large dollar expenditures. NHTSA estimates that the total capital investment required will be between \$3.9 and \$4.8 billion <sup>2/</sup> and that average retail prices of 1985 trucks will increase by between \$350 and \$615 per vehicle compared to 1981 trucks. Third, this rulemaking will set important precedents for future controls on post-1985 vehicles, including passenger cars.

<sup>1/</sup> 44 FR 77199.

<sup>2/</sup> 44 FR 77209. The Regulatory Analysis gives the slightly narrower range of \$4.2 to \$4.8 billion (Preliminary Regulatory Analysis, p. 1).

Finally, we believe that our comments can lead to a significant improvement in the design and effectiveness of the standards.

The report is organized as follows. First, a summary of conclusions and recommendations is presented. Section I provides some background on the statute and on previous NHTSA rulemakings for light duty trucks. Section II describes NHTSA's proposal for model years 1983-85. Section III presents a methodology for setting final standards that would concentrate on minimizing overall vehicle costs (including fuel costs) and discusses the difficulties of using such a methodology. Section IV discusses variations in the standards, both by truck type and by manufacturer, and presents an alternative scheme that results in setting standards that can vary among manufacturers. Section V highlights two aspects of the fuel economy regulations that provide manufacturers additional flexibility -- credits for exceeding the standard and nonconformance penalties for falling short -- and suggests ways in which these mechanisms might be improved.

Summary of Conclusions and Recommendations

In its Notice of Proposed Rulemaking and its Regulatory Analysis NHTSA has outlined the important issues it must resolve in determining appropriate fuel-economy standards. On most of these issues RARG has been unable to reach firm conclusions. Thus we have no specific findings on the cost and efficacy of various technologies, or the specific standards that should be chosen. Our suggestions relate to the methodology NHTSA will use to set standards based on its statutory mandate and the available information.

Specifically, RARG recommends that in setting final fuel economy standards for model year 1983-85 light trucks NHTSA:

(1) Use the following two-step procedure:

Step 1. Determine which fuel economy modifications will generate fuel savings greater than their resource costs.

Step 2. Determine whether taking into account two additional factors -- benefits of oil import reduction not reflected in gasoline prices, and consumer costs associated with sacrifices in truck performance -- changes the set of measures that appear desirable.

- (2) Take into account the effect of truck fuel economy standards on the manufacturers' ability to improve automobile fuel economy, given constraints on their financial capability.
- (3) Update cost and effectiveness estimates of fuel economy modifications to ensure that the standards are based upon the most accurate available data.
- (4) Consider using an alternative classification scheme that sets a composite standard based on fleet mix for each manufacturer, thus encouraging manufacturers to meet fuel economy objectives at lowest cost.
- (5) Increase the advantages of the non-compliance penalty by eliminating the stigma of illegality, expanding the carry forward and carry back provisions to more than one year, and allowing credit offsets between truck classes (if classes are used instead of the composite-standard approach).

## I. BACKGROUND

### The Statute

Title V of the Motor Vehicle Information and Cost Savings Act authorizes the Secretary of Transportation to set fuel economy standards for trucks and passenger automobiles. 1/ This authority was delegated to the Administrator of NHTSA in June, 1976. 2/

For passenger cars, the statute requires the Secretary set fleet-wide average fuel economy standards that are the same for all manufacturers. 3/ For other vehicles, the Secretary is authorized to set separate standards for different classes of vehicles. Congress left the choice of appropriate classes to the discretion of the Secretary. 4/

The statute requires that the standards be set by the Secretary at the "maximum feasible average fuel economy level."

1/ 15 U.S.C. 2001 et seq. Title V was enacted as part of the Energy Policy and Conservation Act of 1975. Public Law 94-163.

2/ 41 FR 25015.

3/ 15 U.S.C. 2002(a)(1) and (3). The statute specifies standards for model years 1978-80 and for model year 1985 and after. It authorizes the Secretary to set standards for model years 1981-84. 15 U.S.C. 2002(a)(1).

4/ 15 U.S.C. 2002(b).

5/ 15 U.S.C. 2002(b).

In making this discretionary determination, the Secretary is required to consider technological feasibility, economic practicability, the effect of other Federal motor vehicle standards on fuel economy, and the need of the nation to conserve energy. 1/ The standards must be issued at least 18 months before the beginning of the model year to which they apply. 2/ Average fuel economy, and the gasoline equivalency of alternative fuels, are to be determined in accordance with rules and procedures established by EPA. 3/

#### Previous Rulemakings

The first truck standards were established for model year 1979 trucks in March 1977. 4/ The standards covered light duty vehicles with a gross vehicle weight rating (GVWR) of 6,000 pounds or less. They required manufacturers to achieve a corporate average of 15.8 miles per gallon (mpg) for 4-wheel drive general utility trucks and 17.2 mpg for all other light trucks. At the same time, manufacturers were given the option of meeting a combined standard of 17.2 mpg. Captive imports (vehicles sold by a domestic manufacturer but not produced in the United States or Canada) were allowed to be included in determining manufacturer compliance with the model year 1979 standards.

1/ 15 U.S.C. 2002(e).

2/ 15 U.S.C. 2002(b).

3/ 15 U.S.C. 2003(a)(2), (d)(1), and (d)(2).

4/ 44 FR 13807. The statute requires standards to be issued 18 months before the start of the model year. 15 U.S.C. 2002(b).

NHTSA issued standards for model years 1980 and 1981 light trucks in March 1978, 1/ expanding their coverage to vehicles with a GVWR up to and including 8,500 pounds. (The 1970 standard applied only up to 6000 pounds). Exercising this discretionary authority more than doubled the number of vehicles subject to fuel economy standards and conformed to the definition of light trucks used in EPA's emission standards. The new standards were 16.0 mpg for 2-wheel drive (4X2) and 14.0 mpg for 4-wheel drive (4X4) light trucks in model year 1980, and 18.0 and 15.5 mpg respectively in model year 1981. Captive imports would no longer be included for determining compliance. Separate standards were set (14.0 mpg in model year 1980 and 15.0 mpg in model year 1981) for manufacturers whose trucks were powered exclusively by engines not used in passenger cars. These standards applied only to International Harvester (IH), which appeared unable to meet both emission limitations and normal fuel economy standards. 2/ In response to a petition from Chrysler Corporation, NHTSA reduced the model year 1981 4X2 standard from 18.0 to 17.2 mpg in June 1979. 3/

1/ 43 FR 11995.

2/ 44 FR 77201.

3/ 44 FR 36975.

Previous rules provided that the 1981 standards would be lowered by 0.5 mpg if EPA did not approve the use of improved lubricants in fuel economy testing by January 1, 1980. EPA recently informed the Department of Transportation that it will not approve their use by the deadline. Accordingly, the current proposal also serves notice that the 1981 standards will be lowered by 0.5 mpg. Thus, the current standards for model years 1980-81 are:

	<u>Model Year</u>	
	<u>1980</u>	<u>1981</u>
4X2 vehicles	16.0	16.7
4X4 vehicles	14.0	15.0
IH	14.0	14.5

## II. THE NHTSA PROPOSAL

Setting light truck fuel economy standards is a two-step process. The first step is to establish the classes of trucks subject to individual standards. The second step is to set average fuel economy standards for each class.

Following its practice in previous rulemakings, NHTSA has proposed setting separate standards for 2-wheel drive, 4-wheel drive, and captive import trucks. It originally established the 4-wheel drive class primarily to accommodate the special characteristics of the American Motors fleet, which consists almost exclusively of 4X4 trucks with high off-road performance and low fuel economy. 1/ It established the captive import class to avoid encouraging an expansion of imports. (The effect of the separate class is to require the domestic fleet to meet the fuel economy standards without counting fuel-efficient imports). 2/

NHTSA has also requested comment on continuing the special "limited product line" class for International Harvester trucks and on establishing a special class for Chrysler trucks. NHTSA originally established the separate standard for International Harvester because the company had little experience developing emission control technology and appeared unable to meet both emissions and normal fuel economy standards in model years through 1982. 3/ NHTSA seeks comment

1/ 44 FR 77200.

2/ Ibid.

3/ 44 FR 77201.

on establishing a separate standard for Chrysler because of its financial difficulties. 1/ Finally, NHTSA has excluded diesel engines from its assessment of maximum feasible fuel economy because of uncertainty about associated environmental effects. 2/

NHTSA has presented a range of possible standards for 4X2 and 4X4 trucks. It proposes to apply similar final standards to captive imports, and states that the final standards will "most likely be within" the proposed ranges. 3/ It implies, however, that final standards will not be at the low end of the range. 4/ It has not proposed numerical standards for the possible International Harvester and Chrysler exceptions.

The suggested ranges for 4X2 and 4X4 truck standards (including, for purposes of comparison, the proposed 1982 standard) are set forth in Table I.

Table I  
Range of Proposed Standards (MPG)

<u>Model Year</u>	<u>4X2</u>	<u>4X4</u>
1982	17.4	15.6
1983	18.0 - 20.0	15.6 - 18.0
1984	18.8 - 21.4	16.1 - 19.3
1985	19.7 - 22.4	16.2 - 19.9

1/ 44 FR 77201, 9. Its low average fuel economy, at least relative to GM, may also be a factor.

2/ 44 FR 77201, 4, and 8.

3/ 44 FR 77202.

4/ 44 FR 77202, 3.

NHTSA set these ranges using variants of its so-called "base case" analysis. In its base case NHTSA assumes, first, that manufacturers will apply certain fuel-economizing technologies to models that do not yet incorporate them and, second, that manufacturers will introduce a moderate number of new, downsized models. <sup>1</sup> The projected base case fuel economy levels for AM, Chrysler, Ford, and GM are set forth in Table II. <sup>2</sup>

Table II  
Fuel Economy (MPG) in the Base Case

4 X 2			
	1983	1984	1985
AM-----	19.1	20.1	20.9
Chrysler-----	18.9	19.8	20.7
Ford-----	19.4	19.9	22.2
GM-----			
4 X 4			
AM-----	16.4	16.9	17.1
Chrysler-----	17.9	18.4	18.8
Ford-----	17.2	17.5	18.4
GM-----	17.4	17.8	19.3

<sup>1</sup> The fuel-economizing technologies include interactive electronic engine controls, improved engine driven accessories, improved lubricants, improved radial tires, improved transmissions, and new engine types (the PROCO engine and turbo-charged engines). 44 FR 77202-4. NHTSA expects the major base case fuel economy gains to come from the introduction of new models. 44 FR 77204-5.

<sup>2</sup> International Harvester was excluded as a special case, and foreign manufacturers were excluded because their U.S. exports are substantially more fuel efficient than U.S. fleets. 44 FR 77205. The data on which these estimates rely were most recently updated in July, 1979, when the 1981 standards were amended.

The lower ends of the proposed ranges are based on the base case for the "least capable manufacturer" (either AM, Chrysler, or Ford, depending on the year and class), adjusted for a 5 percent emission-control fuel penalty. 1/ The higher ends of the proposed ranges are based on an average of NHTSA's fuel economy projections for each company under two alternative fuel economizing scenarios. Each scenario is a modification of the base case, involving in one instance accelerated introduction of new models, and in the other instance smaller engines. 2/ The new model scenario is based on an accelerated timetable for introducing and selling specific new models. The small engine scenario is based on redesigning engines toward minimum performance standards that NHTSA characterizes as "roughly equivalent to performance levels of the early 1950's" 3/ The projected fuel economy levels under the two scenarios are set forth in Table III.

1/ 44 FR 77202. NHTSA states that it "is currently of the view that this penalty need not exist, but invites comment on the question." Ibid. NHTSA's decision depends in part on what standards EPA promulgates, and what technologies manufacturers must use to comply.

2/ NHTSA also explored a "payload reduction" scenario, but discovered that it resulted in little additional fuel saving  
44 FR 77206.

3/ 44 FR 77206. The criteria are that when the truck is fully loaded it must be able to: 1) maintain a speed of 45 miles per hour on a 3 percent grade; 2) move 90 feet from a dead stop in 5 seconds on level ground; 3) start from a dead stop on a 17 percent grade and 4) accelerate from a dead stop to 50 miles per hour in 25 seconds on level ground.

Table III

Fuel Economy in Alternative Scenarios (MPG)

New Model Scenario

	4X2			4X4		
	1983	1984	1985	1983	1984	1985
AM-----	-----	-----	-----	16.4	18.9	19.0
Chrysler	19.8	20.5	22.3	18.2	18.7	19.1
Ford-----	19.5	20.6	22.5	17.4	19.9	19.7
GM-----	19.6	22.2	22.6	17.6	19.3	19.6

Small Engine Scenario

	1983	1984	1985	1983	1984	1985
AM-----	-----	-----	-----	18.9	21.0	21.1
Chrysler	20.5	22.0	22.5	19.2	20.5	20.7
Ford-----	20.2	22.0	22.0	18.1	18.8	19.9
GM-----	20.2	21.1	22.5	18.6	19.6	20.0

### III. SETTING STANDARDS

NHTSA has substantial discretion in setting fuel economy standards, provided that it considers four listed statutory factors. <sup>1/</sup> NHTSA has highlighted its discretion by proposing a range of possible standards for comment and by inviting comments on specific factors that might be considered in choosing final numbers. In this section, RARG recommends that NHTSA frame its choices by adopting a two-step procedure that focuses on identifying the costs and benefits to the nation of successively more stringent standards. We also consider the problems that arise in implementing such a procedure using the data available to NHTSA. Using the proposed procedure will not mechanically produce a definite set of standards; judgment will still be required. The recommended procedure should, however, aid NHTSA in using its judgment to set standards that are in the national interest.

#### A. METHODOLOGY

Although fuel economy is a very important goal, costs must be taken into account in determining to what extent to pursue fuel conservation in any particular sector of the economy. In this area, as in all others, our nation's resources are not limitless, and

<sup>1/</sup> "...in determining maximum feasible average fuel economy the Secretary shall consider (1) technological feasibility; (2) economic practicability; (3) the effect of other Federal motor vehicle standards on fuel economy; and (4) the need of the nation to conserve energy." 15 U.S.C. 2002(e).

using domestic resources to conserve energy or save imported oil means that these resources cannot be used elsewhere. In addition, we want to ensure that we obtain the maximum fuel savings for a given amount of resources devoted to vehicle fuel economy.

For these reasons, RARG urges NHTSA to consider the light truck standards in the broader context of its motor vehicle fuel economy rulemaking. In most cases, the resources that manufacturers will have to devote to improving truck fuel economy come from the same pocket as those that will be used to finance improvements in automobile fuel economy. The concern that once may have existed that the public might circumvent tight fuel economy standards on large passenger cars by purchasing fuel inefficient light trucks and vans seems less relevant today. The recent gasoline price increase has shifted concern from whether consumers can be induced to purchase small cars to how fast their demand for these vehicles can be accommodated. This does not mean that NHTSA should avoid setting light truck fuel economy standards - it cannot under the statute. It does mean that, in establishing its standard, NHTSA should take into account the changed market and the higher opportunity cost that must now be placed on resources used to accelerate truck fuel economy beyond that which the market itself would dictate.

The two-step procedure we propose, which can be applied to both cars and trucks, provides a convenient framework for deciding at what level to set the fuel economy standards. It also encourages the greatest fuel economy benefits for a given expenditure of resources.

Step 1. In its Rulemaking Support Document and its Preliminary Regulatory Analysis, NHTSA has identified the variety of ways that truck manufacturers can improve fuel economy. These include technological modifications aimed solely at improving fuel economy, and various changes in other truck attributes (smaller payload, smaller engines, and so forth) that also improve fuel economy. The first step in determining fuel economy standards is to determine which of these changes generate fuel savings that are greater than their resource costs.

If all modifications simply involved a tradeoff between resource costs and fuel economy improvements and if fuel economy benefits were measured solely by the expected price of gasoline, NHTSA's mandate would be relatively straightforward. The Agency could simply set standards to require fuel economy improvements equal to those achieved by the set of changes warranted under Step 1. 1/ Unfortunately, neither the costs nor the benefits are always so straightforward.

Some of the fuel economy changes NHTSA has used to define its range may dramatically change other attributes of trucks by, for example, decreasing payload or acceleration. Because consumers value truck performance, changes in these attributes are properly charged as costs of the fuel economy regulations.

On the other hand, improved fuel economy may lead to reduced oil imports, which generates benefits beyond those measured by the price of gasoline, even if the price of gasoline is based on the

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1/ Of course difficulties arise even in this straightforward case. For example, the Agency must determine the fuel economy effects of other vehicle standards, primarily emission standards. The Agency must also evaluate special technological and financial problems affecting some companies and the possibility that more stringent regulations will affect competition in the industry.

assumption that imported oil is used to produce the gasoline. These indirect benefits relate to national security, the balance of payments, and the reduced pressure of demand on the world oil market. In short, even if the additional production costs stemming from a more stringent standard are greater than the direct value of the gasoline saved, as calculated in Step 1, it might still be worthwhile to impose the more stringent standard. Similarly, a more stringent standard might not be worthwhile, even though it passed the Step 1 test, if it generates substantial reductions in performance attributes highly valued by consumers. These additional costs and benefits can be called "non-price" costs and benefits, because they are not captured by the analysis of price effects in Step 1.

Step 2. We recommend that NHTSA use a second step to evaluate the wisdom of various fuel economy modifications, thus providing an explicit framework for exercising judgment in cases where non-price costs or benefits are involved. With regard to non-price benefits, NHTSA can calculate the amount by which the added production costs exceed the value of gasoline saved, translate that into an amount per barrel of reduced oil imports, and ask whether the associated benefits are worth the implicit premium being paid. To take an example, if the excess costs of a particular modification amount to a \$3 premium per barrel of imported oil saved, NHTSA might well decide that the indirect gains are worthwhile. If, on the other hand, the excess costs were to translate into a premium of \$30 per barrel saved, NHTSA might well decide that the gains were not worth the cost. The Department of Energy, among others, has published

estimates of the social premium for oil imports; 1/ NHTSA should use some such estimate as a benchmark for its analysis.

Consumer costs can be considered in a roughly analogous manner. For example, a modification that generates average fuel savings of \$50 per year but decreases acceleration by 3 percent might well be found to yield net benefits. On the other hand, if a change generated the same fuel savings but decreased acceleration by 30 percent, NHTSA might conclude that the fuel gains were not worth the performance costs.

This two-step procedure is consistent with the basic approach and the data contained in the NHTSA proposal. For example, the preliminary regulatory analysis lists the retail truck price increase per 1 mpg improvement for each model year, by company and by truck type, for the four cases NHTSA identified. 2/ These results indicate significant variations in the cost-effectiveness of various control technologies, since the retail price increase per mpg varies from \$33 to \$253. It is difficult to use this information in its current form because it combines a number of fuel economy modifications, and because the figures are not directly comparable to costs and benefits. But it would be possible, using the same data, to calculate the cost of fuel reduction benefits of individual changes as part of a Step 1 analysis.

1/ 44 FR 29854 ff.

2/ Preliminary Regulatory Analysis, p. IV-14.

## B. DIFFICULTIES

The methodology recommended here should not be considered a counsel of perfection. RARG recognizes the difficulties of estimating the costs and benefits -- and effects such as the impact on particular firms or on industry competition -- of fuel economy standards. Two major problems are the reliability of the underlying cost and effectiveness data, and the treatment of changes in truck attributes.

### Technology and Cost Data

NHTSA's determination of the "maximum feasible fuel economy" for the truck classes it chooses to use will be based in large part upon its judgment of the effectiveness, timing, and costs of various technological modifications in the fleet. One important set of issues concerns the accuracy of these basic data. Can the technologies projected by NHTSA be available to the various truck producers according to the timetable NHTSA has assumed? Will the technologies, individual and in combination, generate the fuel savings predicted? Are the cost estimates reliable?

RARG cannot develop independent judgments about these various technology and cost issues. Indeed, even NHTSA's judgments must be based in large part on the companies' submissions. We urge NHTSA to continue to make its underlying assumptions explicit. Using a reasonable methodology to set standards will be of little use if the underlying data are unreliable.

Treatment of Changes in Vehicle Performance

The high end of NHTSA's proposed range for fuel economy standards is based on the wider introduction of new, smaller truck models and on reductions in engine size. NHTSA identifies as major issues in this rulemaking the extent to which manufacturers can "successfully market the new, smaller truck models" and the extent to which average engine displacement can be reduced "consistent with light truck functional and marketing considerations." 1/ RARG believes that it would be better to view changes in vehicle performance as additional costs of requiring particular fuel economy modifications rather than as a "marketability" issue. Reductions in vehicle performance represent real costs to consumers and should be accorded a weight equivalent to that accorded production costs initially imposed on manufacturers.

Consider the reductions in engine size that NHTSA projects in its small engine scenario. To analyze the potential fuel economy improvement from engine size reductions, the agency determined "the minimum functional performance criteria which trucks must be able to meet to do the jobs for which they are designed." 2/ These criteria produce a light truck fleet with performance "roughly equivalent to trucks of the early 1950's." NHTSA estimates that these engine size

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1/ 44 FR 77200.

2/ The criteria are that when the truck is fully loaded (at GVWR), it must be able to: (1) maintain a speed of 45 miles per hour on a 3 percent grade; (2) move 30 feet from a dead stop in 5 seconds on level ground; (3) start from a dead stop on a 17 percent grade; and (4) accelerate from a dead stop to 50 miles per hour in 25 seconds on level ground. 44 FR 77206.

reductions result in a cumulative net lifetime consumer savings of \$1,120 per vehicle. <sup>1/</sup> But these figures exaggerate the net savings since they do not take into account consumer losses from reducing payload, acceleration, and speed.

These losses in consumer welfare are not easy to measure. In principle, they could be estimated by asking how much consumers would have to be paid to select voluntarily a mix of trucks that has the 1950's performance level. It may be possible for NHTSA to amass information from surveys or statistical studies of truck market choices that shed some light on these consumer valuations. <sup>2/</sup> But even if specific quantitative information is lacking, it should be possible to display the tradeoffs between resource cost, fuel economy, and performance -- the Step 2 analysis in our proposed procedure -- as the basis for rough judgments on overall consumer welfare.

Treating performance changes directly in this manner could also help explain the rationale for some technological modifications that appear to be expensive relative to their fuel economy benefits. For example, turbocharging is expensive, but can improve both fuel economy and acceleration. In its Regulatory Analysis, NHTSA notes that GM will market turbocharged engines even though they are "not cost-beneficial to the consumer." <sup>3/</sup> It adds that they will be sold

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<sup>1/</sup> 44 FR 77209.

<sup>2/</sup> Recently developed "hedonic" pricing models can be used to evaluate consumers' revealed preference for various truck attributes.

<sup>3/</sup> Preliminary Regulatory Analysis, p. IV-16.

nonetheless, based on their acceleration advantages. One might better view these improvements in acceleration as essentially reducing the costs of obtaining the fuel economy improvements, so that the overall cost is considerably lower than the resource cost of adding turbochargers to the vehicles.

#### IV. THE STRUCTURE OF THE STANDARDS

In addition to choosing levels for fuel economy standards, NHTSA must also establish their structure. It must, for example, decide what separate classes of light truck to establish, if any, and whether to set different standards for different manufacturers. In this section we describe the advantages of providing separate standards for different truck types, point out the disadvantages of too many classifications, and indicate the balance that NHTSA has struck in proposing separate standards for 4X2 and 4X4 trucks. We then suggest an alternative structure that would provide a separate standard for each manufacturer calculated as a weighted average of class standards. <sup>1/</sup> We discuss the advantages of this structure (primarily the possibility of securing fuel economy savings at lower cost), and its possible limitations.

##### A. CURRENT TRUCK CLASSIFICATIONS

###### The Rationale for Performance Classes <sup>2/</sup>

The Act gives NHTSA broad authority to establish separate fuel economy classes for vehicles other than cars. One rationale for this can be illustrated by contrasting the car market with truck markets.

<sup>1/</sup> This proposal differs from previous proposals, described in the final rule for the 1980-81 model years (42 FR 1000), for a weighted average standard in that it uses a predetermined assumption about a manufacturer's fleet mix. This feature is essential to providing the appropriate incentives to shift fleet mix.

<sup>2/</sup> We use the term "Performance class" to refer to classes based on differences in capability or intended use (such as 4X4 vs 4X2). It is not intended to include the special class NHTSA established for imports, which has an entirely different rationale.

Setting standards to encourage trade-offs among all cars, including those made by different manufacturers, allows fuel savings to be achieved at least cost. A perfectly functioning intercorporate market for fuel-economy credits would allow improvements to be made wherever it is cheapest to do so. Manufacturers facing high-cost options for improving fuel economy would bargain with manufacturers who had low-cost options, thus reducing the overall cost to society of achieving fuel economy improvements. It is, however, not possible to establish such a market under current law, and might be impractical to do so in any case.

The advantages of an intercorporate market in fuel economy credits may, however, be largely redundant in car markets. The major manufacturers all produce a range of cars from subcompact to full sized. Faced with meeting a single fuel economy standard, each manufacturer can decide whether to place more of its resources into improving the fuel economy of, say, its compact car, or whether to meet the standard by increasing the fraction of fuel-efficient cars it sells. Thus, each manufacturer has full flexibility to achieve its standard at least cost. <sup>1/</sup> Of course, there may be opportunities to reduce costs further by permitting trades among manufacturers or by providing different corporate standards for different manufacturers; but since the mix of cars by class is approximately the same for the

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<sup>1/</sup> Assessing the full cost of mix shifts requires valuing losses in other important car attributes when more fuel-efficient cars are "forced" on the public. These considerations are analogous to the treatment of attribute costs in Step 2 of the recommended procedure for setting standards for a given vehicle class, discussed above. It is possible, however, that manufacturers' perceptions of costs as lower profits may not correspond to society's loss from altering the mix of cars. This latter point is discussed below as a potential difficulty with the composite standard for trucks.

largest manufacturers, and since the technology for improving fuel economy is similar for all manufacturers, additional cost savings from intercorporate trades are likely to be relatively small. This need not have been true, and it is not generally true of foreign manufacturers. For example, it would probably not be desirable to require the same fuel economy targets for Rolls-Royce and Honda. The fleet mixes of the major domestic producers are sufficiently similar, however, that a fixed and uniform standard for cars can achieve a result not much different from standards that allowed intercorporate trading of credits.

The light truck market is very different. For one thing, the diversity of uses is much greater, resulting in much greater potential market segmentation. Some trucks must haul heavy loads; others must fit the maximum volume on a short frame; still others must haul people and are really mini-buses. Some are designed to handle off-road use, others are city vehicles. In addition, truck manufacturers do not produce fleets that are spread identically over this diverse market. IH and AM specialize in four-wheel drive recreational vehicles. The GM fleet is directed more at the commercial market. Even if lighter new models are introduced in certain uses, some powerful heavy-duty models will still be needed for other uses. There is no reason to believe that each manufacturer should be compelled to serve the entire market. Indeed, specialization may be the most efficient way to serve the truck market. <sup>1/</sup> As a result, a single standard for all trucks and all manufacturers is neither a fair nor an efficient way to improve fuel economy.

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<sup>1/</sup> That is, there may be economies of scale in production and distribution that are not realized if all manufacturers market each type of light truck.

Establishing separate standards for different performance classes of trucks avoids forcing specialized manufacturers of high performance trucks either to undertake high cost modifications to meet a common standard or to modify their fleet mix. Logically, two classes of trucks should have separate standards if:

- (1) achievable fuel consumption rates differ substantially between the two classes (when the cost of further fuel economy improvements has reached the appropriate level); and
- (2) the classes make up different fractions of the various manufacturers' fleets.

Separate classes are desirable only if both conditions hold. If classes have large differences in achievable fuel economy but all manufacturers produced the same mix, a combined class standard would not place an inappropriate burden on any one of them.

#### Establishing More Classes: NHTSA'S Compromise

NHTSA has proposed setting separate standards for 4X2 and 4X4 trucks. This can be viewed as a compromise between competing objectives. It seems clear that these two classes meet both of the above criteria, since they achieve much different fuel economy levels, and since manufacturers produce very different mixes of the two types (AM and IH produce no 4X2 trucks, while the three major manufacturers produce about three-quarter 4X2 trucks). But there may be other classes that meet the criteria. For example, two wheeled drive vehicles might be further subdivided by weight into those less than 7,000 pounds and those greater than 7,000 pounds.

Increasing the number of weight and performance classes can lead to standards more finely tuned to each manufacturer's fleet.

One practical difficulty with such classifications is that manufacturers may modify trucks to just avoid a class boundary. Moreover, setting separate standards decreases the flexibility of the regulatory scheme, particularly if credits cannot be carried over among classes. <sup>1/</sup> Finally, once separate standards are established, the manufacturers may have less incentive to replace trucks of one class with those of a more efficient class. For example, it may be less expensive for a manufacturer to achieve fuel savings by producing a greater fraction of light vehicles than by modifying the technology; but changing the mix would not "count" if separate standards are set.

Setting separate standards for 4X2 and 4X4 trucks provides some of the advantages of a single standard scheme -- encouraging cost-effective trades between weight classes -- as well as some of the fairness and efficiency advantages of separate classes. But the scheme is clearly a compromise. In the next section we present an alternative approach that may provide the advantages of a more detailed classification system without its disadvantages.

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<sup>1/</sup> We discuss carry-overs of credits more thoroughly, below.

## B. AN ALTERNATIVE APPROACH

### The Composite Standard

The alternative approach explored here involves setting fuel economy targets for different categories of trucks, and using a pre-determined fleet mix for each manufacturer to turn these targets into a composite standard. To illustrate how such a standard would be set, Table IV converts NHTSA's base case standards for 4X2 and 4X4 trucks into a single composite standard for each manufacturer

Table IV

Calculating a Composite Standard for each manufacturer

		mpg	<u>4X2</u> Fraction	mpg	<u>4X4</u> Fraction	Compos Standard
1983:	GM	18.0	.70	15.6	.30	17.21
	Ford	"	.74	"	.26	17.31
	Chrysler	"	.74	"	.26	17.31
	AM	"	0	"	1.00	15.60
	IH	"	0	"	1.00	15.60
1984:	GM	18.70	.70	16.1	.30	17.90
	Ford	"	.74	"	.26	18.01
	Chrysler	"	.74	"	.26	18.01
	AM	"	0	"	1.00	16.10
	IH	"	0	"	1.00	16.10
1985:	GM	19.70	.70	16.2	.30	18.50
	Ford	"	.74	"	.26	18.65
	Chrysler	"	.74	"	.26	18.65
	AM	"	0	"	1.00	16.20
	IH	"	0	"	1.00	16.20

Note: The fleet mix fractions are those estimated by NHTSA for the 1983 model year. The composite was calculated as an harmonic average, i.e., the inverse of the composite is the weighted average of the inverses of the two separate standards.

These composite standards should achieve about the same fuel savings as the separate base-case standards. However, they give manufacturers both the opportunity and the incentive to meet the standard by replacing 4X4's with 4X2's. Moreover, using the composite approach, NHTSA could establish a richer set of performance categories than simply these two, without removing incentives to shift the fleet mix. To implement the composite approach, NHTSA would use truck categories only as a tool for calculating the fuel economy standards from category by category fuel-economy targets. The composite standard itself would, in the usage of the statute, be classless. <sup>1/</sup>

With appropriate legislation, the fuel economy standards for cars and trucks might be combined into an overall composite standard. This would add more flexibility for finding the least-cost method of saving fuel. Setting separate standards for cars and trucks could conceivably reduce overall fuel economy, by inducing a shift in demand away from cars towards less efficient trucks, although market responses to higher fuel prices seem to have blunted this shift. In any event, a composite car/truck standard would give manufacturers proper incentives to avoid such shifts. NHTSA should explore this option, although it is not available under the current law.

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<sup>1/</sup> Nothing in the statute forbids this approach. The statute requires that passenger car standards be the same for all manufacturers. There is no similar requirement for the truck standards. Indeed, the statute explicitly authorizes separate standards for different classes of trucks, which would inevitably result in varying effects on the different manufacturers. Since this is explicitly permitted, it seems unlikely that composite standards, which would result in similarly varying effects, are forbidden. NHTSA's treatment of this issue in the preamble to its final truck standards for model years 1980-81 suggests that it agrees. 43 FR 11997-8. There, NHTSA discussed a proposed fleet-average standard at some length - eventually rejecting it on policy grounds - without suggesting that it might be illegal.

RARG recognizes that proposing a composite standard for each truck manufacturer raises several potential difficulties, including possible effects on the competitive structure of the industry. We are not prepared to recommend that NHTSA adopt this modification since a full assessment will require considerable additional analysis. We do recommend that NHTSA consider the approach and, in its final regulatory analysis, address the strengths and weaknesses of the approach. In the remainder of this Section we summarize some of the advantages and potential difficulties of the scheme.

#### Advantages of a Composite Standard

The fundamental advantage of composite standards is that they give manufacturers greater flexibility to meet given fuel-economy objectives at lowest cost. Manufacturers have greater discretion to choose which classes of vehicles to improve, and whether to increase production of the more fuel-efficient classes. This flexibility may lower costs for three major reasons. First, the manufacturers may later acquire better information about the costs and effectiveness of fuel-saving options than is available to NHTSA at the time the standards are set. Second, the least cost mix of improvements may vary from manufacturer to manufacturer, making it impossible for NHTSA to set class-specific standards that are optimal for every manufacturer. Third, composite standards allow manufacturers to improve fuel economy by substituting more fuel-efficient classes of trucks for less fuel-efficient classes.

To illustrate this last possibility, suppose that the 4X2 and 4X4 standards are 18 and 16 mpg respectively. Further suppose that, at these levels, the resource cost for an additional 1 mpg improvement in either class is \$50 per car. Under class specific standards, the manufacturer will spend up to \$50 per mpg to improve the fuel economy of any particular vehicle, but will forego an opportunity to improve average fuel economy that may be much cheaper -- replacing some 4X4's with 4X2's. Each such replacement generates a 2 mile per gallon improvement. For small changes, this improvement is virtually costless because at equilibrium prices and quantities, the manufacturer and consumer both are indifferent to small shifts in the relative production of each type of vehicle. The cost -- measured by consumers' losses from inferior truck attributes -- will increase as the production shifts away from the prior equilibrium mix of 4X4 and 4X2 trucks. The composite standard will give the manufacturers the incentive to substitute among classes to the same degree that they exploit every other opportunity to improve fuel economy. <sup>1/</sup> Thus, the composite standard may better encourage achieving mandated fuel savings at least cost, where cost includes both resource cost and changes in consumer valuation of attributes.

<sup>1/</sup> There is a possible complication in comparing the resource costs of technological modifications with the costs resulting from mix shifts toward truck attributes that are less desirable to consumers. Manufacturers will treat as costs, the reduction in profits from shifting from the optimum number of, say, 4X4 trucks. But profit change may not accurately reflect the welfare cost of the shift. The bias depends upon the circumstances of demand and costs facing the manufacturer, and on the manufacturer's market power; profit changes will overstate welfare losses under some circumstances and understate welfare losses in others. We have no reason to expect, however, that these distortions will affect the relative cost-minimization advantages of a composite standard compared to a class-by-class approach.

The composite standard may also give NHTSA the freedom to use a richer set of classes to deal with the problem of setting standards that are achievable by the manufacturer least capable of making fuel economy improvements. For example, in the 1980-81 rule-making, IH requested that NHTSA establish a separate class for trucks with a gross vehicle weight rating over 6000 pounds to accommodate its greater proportion of heavy trucks. The agency declined, noting that establishing such a separate class would remove any incentive for IH to improve fuel economy by reducing the GVWR of its trucks below 6000 pounds. 1/ Instead, NHTSA found other grounds for establishing a special IH class. But under a composite standard, the IH proposal would have had fewer drawbacks. A composite that included a class for heavier trucks would accommodate the IH fleet, without removing the incentive to downsize it. As discussed above, the criteria for designating additional classes should be performance-related differences in potential fuel economy and different representation in different fleets.

1/ 43 FR 11997-8.

Difficulties with the composite standard

1. Establishing fleet mix assumptions

An essential feature of the proposed composite standards is that the assumed fleet mix for each manufacturer must be established before the model year to which the standards apply. 1/ Projecting fleet mix accurately can be quite difficult, however, and embedding such projections in composite standards may be inadvisable. For example, projecting fleet mixes might require NHTSA to make quite subjective judgments about manufacturers intended marketing plans. To avoid having to make projections, NHTSA might consider basing each year's composite standard on a lagged fleet mix; for example, a manufacturer's 1985 standard might be based on its 1983 fleet mix. A two or three year lag would allow the standards to be continually and automatically adjusted as manufacturers changed their fleet composition.

While using a lagged fleet mix assumption will give an incentive to produce more fuel efficient classes, the incentive may be partly diluted by the manufacturers' recognition that this year's change in fleet mix will tighten a future year's standard. There may also be other drawbacks to the use of lagged data, such as opportunities for dynamic "gaming" by manufacturers and limitations on the manufacturers' flexibility to respond to abrupt changes in market demand for truck types. We urge NHTSA to explore the advantages and disadvantages of alternative methods of specifying fleet mix.

1/ The fleet mix assumption must be established in advance so that manufacturers have a fixed benchmark against which improvements in fuel economy can be measured. In contrast, if the composite standard were based on the actual fleet mix of the model year, the manufacturer would not have an incentive to increase its mix of fuel-efficient trucks.

## 2. Competitive effects

A composite standard is likely to change the relative prices of truck types, compared to prices under a class-specific standard. Manufacturers will tend to increase the price of trucks with poor fuel economy, and lower the price of fuel-efficient trucks as they meet the composite standard.

While this change in the relative prices of different truck classes should result in consumer choices more consistent with overall national objectives, the change may also have unequal impacts on different manufacturers. For instance, the profitability of companies that specialize in 4X1s could increase compared to those who produce mostly 4X2s. On the other hand, the increased flexibility of the composite standard may benefit primarily those manufacturers with the most diversified fleets, or those with inadequate capital to improve all models simultaneously. These differential firm effects could influence the structure of the industry, and deserve careful examination.

Another difficulty under composite standards is that they may impose an unfair burden on a manufacturer which decides to increase its mix of a less fuel-efficient class of vehicle. While the market as a whole may be shifting toward the more fuel-efficient classes, there is no reason to force each manufacturer to do so. The composite standard would make it very difficult for a manufacturer to, say, terminate his production of 1X2s while continuing to make 4X4s. For this reason, NHTSA might preserve the option of meeting class specific standards as an alternative means of compliance.

Providing both options may, however, have its own drawbacks. For instance, if two manufacturers started to specialize in different classes, one of them could get credit for increasing the fuel efficiency of its fleet mix, while the other selected the class-standard option and avoided being charged for decreasing the efficiency of its mix.

## V. THE NON-COMPLIANCE PENALTY

The governing statute imposes a civil penalty on manufacturers whose average fuel economy for a class is below a standard. The penalty is set at \$5 per vehicle for each tenth of a mile-per-gallon below the standard. 1/ A class' average fuel economy is based on the sales-weighted harmonic average for all vehicles in the class produced by the manufacturer, using fuel economy values measured by EPA according to its fuel economy test procedures. Penalties for not achieving the standard may be offset by credits (also \$5 per vehicle for each tenth of a mile-per-gallon above the standard) earned for the class in the prior or subsequent model year. 2/ The penalty may, moreover, be waived or modified if this is necessary to avoid bankrupting a manufacturer or substantially lessening competition. 3/ In its third Annual Report to the Congress on the Automotive Fuel Economy Program, the Department of Transportation recommended that the period for earning credits be extended to three years, both prior and subsequent to the model year in question.

RAPG applauds the use of monetary non-compliance penalties to secure conformance with fuel economy standards. Such penalties

1/ 15 U.S.C. 2007(2) and 2008(b)(1)(B). The secretary of Transportation may by rule increase the \$5 penalty to be high as \$10 provided he makes certain findings. 15 U.S.C. 2008(d).

2/ 15 U.S.C. 2008(a)(3)(B).

3/ 15 U.S.C. 2008(b)(3). The penalty may also be waived or modified if the manufacturer shows that this violation resulted from an act of God, a strike, or a fire. Ibid.

are preferable to outright prohibitions in that they allow manufacturers some flexibility - provided they are willing to pay the price - while keeping steady pressure for conformance.

The provision allowing carry forward and carry back of credits is a particularly attractive feature. It encourages manufacturers to look for fuel economy improvements in the years in which they can be secured most cheaply, since the resulting credits can be used in other years.

The noncompliance penalty might be even more attractive if it were treated as a "fee" rather than a penalty; if failure to meet individual standards were not characterized as "unlawful conduct;" if the provisions allowing carry forward and back were expanded to cover more years; and if carry overs to other classes of trucks, and perhaps even passenger automobiles were allowed. RARG endorses NHTSA's efforts to secure the first three of these changes through legislation. We believe, in addition, that allowing credit carryovers to other classes may, at least in some instances, be desirable. Inter-class averaging can provide many of the flexibility advantages of the composite standard alternative. We urge NHTSA to examine this use of credits along with its evaluation of the composite standards.